Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1.- 43. (cancelled)

44. (previously presented) A process for making a metallic substrate having a vitreous coating, wherein the process comprises

(a) applying an alkali metal silicate-containing coating sol to the substrate to provide a coating layer on the substrate; and

(b) thermally densifying the coating layer of (a) by a two-stage heat treatment comprising,

(i) in a first stage, a heat treatment carried out either (A) in an oxygen-containing atmosphere to an end temperature of at least 350°C or (B) in a vacuum at a residual pressure of ≤ 15 mbar to an end temperature of at least about 120°C, and

(ii) in a second stage, further densification by a heat treatment in a low-oxygen atmosphere up to full densification with formation of a vitreous layer.

45. (previously presented) The process of claim 44, wherein the heat treatment of the first stage is carried out according to alternative (A) at an end temperature of up to about 400°C.

46. (previously presented) The process of claim 45, wherein the oxygen-containing atmosphere

comprises from15 % to 90 % by volume of oxygen.

47. (previously presented) The process of claim 44, wherein the heat treatment of the first stage is carried out according to alternative (B) at an end temperature of up to about 500°C.

48. (previously presented) The process of claim 44, wherein the heat treatment of the first stage is carried out according to alternative (B) at an end temperature of up to about 200°C and at a residual pressure of ≤ 5 mbar.

49. (previously presented) The process of claim 44, wherein the heat treatment of the second stage is carried out at an end temperature in a range of from 400° to 600°C.

50. (previously presented) The process of claim 49, wherein the heat treatment of the second stage is carried out at an end temperature in a range of from 540° to 560°C and in an atmosphere which comprises ≤ 0.5 % by volume of oxygen.

51. (previously presented) The process of claim 49, wherein the heat treatment of the second stage is carried out in an inert gas atmosphere.

52. (previously presented) The process of claim 44, wherein the process further comprises cooling the heat-treated substrate at a cooling rate of from 1 to 10 K/min.

53. (previously presented) The process of claim 44, wherein (b) is preceded by a drying of the applied coating layer.

54. (previously presented) The process of claim 44, wherein the alkali metal silicate-containing coating sol is obtainable by a process comprising a hydrolysis and polycondensation of one or more silanes of formula (I)

R_nSiX_{4-n} (I)

wherein the radicals X independently represent hydrolyzable groups or hydroxyl groups, the radicals R independently represent hydrogen, alkyl, alkenyl and alkynyl groups having up to 4 carbon atoms and aryl, aralkyl and alkaryl groups having from 6 to 10 carbon atoms, and n is 0, 1 or 2, with the proviso that at least one silane where n = 1 or 2 is used, or oligomers derived therefrom,

in the presence of

(a) at least one compound selected from oxides and hydroxides of alkali metals and alkaline earth metals, and

(b) optionally, nanoscale SiO_2 particles.

55. (previously presented) The process of claim 54, wherein the at least one compound is used in such an amount that an atomic ratio Si : (alkali metal and/or alkaline earth metal) is in a range of from 20:1 to 7:1.

56. (previously presented) A process for making a metallic substrate having a vitreous coating,

wherein the process comprises

(a) applying an alkali metal silicate-containing coating sol to the substrate to provide a coating layer on the substrate;

(b) drying the applied coating layer at room temperature or elevated temperature to obtain a dried coating layer, and

(c) thermally densifying the dried coating layer of (b) by a two-stage heat treatment comprising,

(i) in a first stage, a heat treatment carried out either (A) in an oxygen-containing atmosphere to an end temperature of at least 350°C or (B) in a vacuum at a residual pressure of ≤ 15 mbar to an end temperature of at least about 120°C, and

(ii) in a second stage, further densification by a heat treatment in a low-oxygen atmosphere up to full densification with formation of a vitreous layer.

57. (previously presented) The process of claim 56, wherein (b) is carried out at a temperature of up to 100°C.

58. (previously presented) The process of claim 56, wherein (b) is carried out at a temperature of up to 80°C.

59. (previously presented) The process of claim 56, wherein the heat treatment of the first stage is carried out according to alternative (A) at an end temperature of up to about 400°C.

60. (previously presented) The process of claim 59, wherein the oxygen-containing atmosphere comprises from 15 % to 90 % by volume of oxygen.

61. (previously presented) The process of claim 56, wherein the heat treatment of the first stage is carried out according to alternative (B) at an end temperature of up to about 500°C.

62. (previously presented) The process of claim 56, wherein the heat treatment of the first stage is carried out at an end temperature of up to about 200°C and at a residual pressure of $\leq$ 5 mbar.

63. (previously presented) The process of claim 56, wherein the heat treatment of the second stage is carried out at an end temperature in a range of from 400° to 600°C.

64. (previously presented) The process of claim 63, wherein the heat treatment of the second stage is carried out at an end temperature in a range of from 540° to 560°C and in an atmosphere which comprises $\leq$ 0.5 % by volume of oxygen.

65. (previously presented) The process of claim 63, wherein the heat treatment of the second stage is carried out in an inert gas atmosphere.

66. (previously presented) The process of claim 56, wherein in the second stage a residence time at a maximum temperature is from 20 to 60 minutes.

67. (previously presented) The process of claim 56, wherein the process further comprises cooling the heat-treated substrate at a cooling rate of from 1 to 10 K/min.

68. (previously presented) The process of claim 56, wherein the alkali metal silicate-containing coating sol is obtainable by a process comprising a hydrolysis and polycondensation of one or more silanes of formula (I)

R_nSiX_{4-n} (I)

wherein the radicals X independently represent hydrolyzable groups or hydroxyl groups, the radicals R independently represent hydrogen, alkyl, alkenyl and alkynyl groups having up to 4 carbon atoms and aryl, aralkyl and alkaryl groups having from 6 to 10 carbon atoms, and n is 0, 1 or 2, with the proviso that at least one silane where n = 1 or 2 is used, or oligomers derived therefrom,

in the presence of

(a) at least one compound selected from oxides and hydroxides of alkali metals and alkaline earth metals, and

(b) optionally, nanoscale SiO_2 particles.

69. (previously presented) The process of claim 68, wherein the at least one compound is used in such an amount that an atomic ratio Si : (alkali metal and/or alkaline earth metal) is in a range of from 20:1 to 7:1.

70. (previously presented) The process of claim 69, wherein the atomic ratio is from 15:1 to 10:1.

71. (previously presented) The process of claim 70, wherein an average value of n in the silanes of formula (I) is from 0.2 to 1.5.

72. (previously presented) The process of claim 71, wherein the average value of n is from 0.5 to 1.0.

73. (previously presented) The process of claim 44, wherein a thickness of the vitreous layer is from 2.5 to 4.5 μm.

74. (cancelled)

75. (previously presented) The process of claim 44, wherein the substrate has a structured surface.

76. (previously presented) The process of claim 44, wherein the substrate comprises at least one of steel, stainless steel, zinc-plated steel, chromium-plated steel and enameled steel.

77. (new) The process of claim 44, wherein the vitreous coating is cold-deformable.